REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the following reasons.

I. Status of the Claims

Claims 2, 3, 5, 7, 8, and 10 were cancelled previously. Withdrawn claims 11-13 are cancelled in this response, pursuant to the examiner's request. Applicants reserve the right to file one or more continuing or divisional application to pursue the subject matter of any cancelled claims. Claim 1 has been amended for greater clarity.

Applicants acknowledge the finality of the outstanding Office Action. The claim revisions introduce no impermissible new matter and require no additional search, but they do place the application in condition for allowance or, at least, in better condition for appeal. Thus, applicants request entry of this amendment. Upon entry, claims 1, 4, 14, and 15 will be pending.

II. Rejection of Claims under 35 U.S.C. §103(a)

A. Kasuga and Byrne

Claims 1, 4, and 14 are rejected for alleged obviousness over Kasuga *et al.*, *Nature Biotechnology* 17: 287-91 (1999), in view of U.S. patent No. 5,584,140 to Byrne *et al.* Claim 15 is rejected over Kasuga in view of Byrne and Dalton *et al.*, *Plant Science* 132: 31-43 (1998). Applicants respectfully traverse each rejection.

(i) One skilled in the art would not have had any reason to combine the teachings of the cited references, thereby arriving at the claimed invention.

Kasuga describes a transgenic herbaceous plant produced by transforming *Arabidopsis* with DREB genes, thereby to impart drought, salt, and freezing tolerance. See the cited reference in the abstract and in the paragraph bridging pages 287 and 288.

Examiner Kumar has acknowledged that Kasuga fails to teach obtaining a scion from disclosed, transgenic *Arabidopsis* plant. See final action at page 5, first full paragraph. So saying, the examiner is understood to invoke Byrne for conventional usage of scions, obtained as cuttings from a mother plant, for grafting-based propagation. *Id.*, second full paragraph.

According to the examiner, one skilled in the art would have been motivated to propagate the transgenic *Arabidopsis* plant by Byrne's method to "eliminat[e] the expensive and time consuming steps of plant tissue culture and transformation." *Id.*, last paragraph. Yet, propagation of *Arabidopsis* material from scions is not mentioned in any cited reference.

Examiner Kumar seems not to intend a reliance in this regard on "Common Knowledge in the Art or 'Well Known' Prior Art," pursuant to MPEP § 2144.03. Accordingly, he must be understood to argue that the skilled artisan would have generalized Byrne's rooting method for vegetative plant propagation of hard-to-root plants, on "efficiency" grounds, to any and all plant types, including *Arabidopsis*.

This proposition not only is unsupported on the record, however, but also is erroneous as a matter of fact.

First, and more generally, propagation by scions or cuttings is not universally desirable, because some plant species or breeds develop bad rhizogenesis from scion propagation. Consequently, problems associated with the survival rate arise, due to decreased rooting and propagation efficiency.

Second, and more specifically, Byrne's propagation methodology would not have been readily applicable to Kasuga's transgenic *Arabidopsis* plant. Thus, as Byrne's abstract indicates, the prior-art method entails developing etiolated shoots on stock plants, removing those shoots, developing roots from the shoots, and then planting the rooted shoots. Tables 1-3 exemplify plants that are suitable for such manipulations, and all are woody plants, such as apple, beech, birch, and chestnut. In keeping with this orientation, Byrne further requires that the stock plant

be grown to a mean diameter of at least ¾ inch and a height of 3 feet (column 8, lines 2-5), and that cuttings not be done until the shoots are in transition from a "softwood" stage to "semi-hardwood" stage (column 10, lines 3-10).

These softwood/hardwood directions would have been meaningless with regard to herbaceous plants in general and particularly to *Arabidopsis*, which usually grows to maximum height of only 20 to 25 cm (for instance, see Figures 1 and 3 of Kasuga). It is not surprising, therefore, that Byrne fails even to hint at how his methodology might apply to a herbaceous plant. Indeed, the aforementioned teachings, if anything, would have directed the skilled artisan ***away*** from thinking that Byrne's propagation method for woody plants could applied to advantage with respect to Kasuga's transgenic *Arabidopsis* plant.

Given these defects in the evidentiary record, applicants are obliged to point out the decidedly *ad hoc* cast of the examiner's rationale. In fact, only impermissible hindsight could explain why one of ordinary skill would have transitioned from Kasuga's work with a model organism, *Arabidopsis thaliana*, to an *a priori* reasonable expectation of some desirable result achieved by propagating DREB-transformed plant material via scions, a technique associated primarily with tree and shrub husbandry.

To substantiate the rejection, therefore the examiner has made a legal error by breaking the claimed invention into elements, looking for each element in prior art, and then assembling the elements in accordance with a road map provided by Applicants' claimed invention. For this reason alone, the rejection should be withdrawn.

(ii) The combined teachings of the cited references fail to render the claimed invention obvious.

The examiner asserts that one skilled in the art would have expressed Kasuga's DREB gene in a plant to obtain the stress-resistant features, and that such plant also would have exhibited other characteristics, including improved rooting efficiency and prolonged vase life of flowers. See final action at page 6, first paragraph.

In fact, neither of the cited references suggests that introducing DREB gene would have any effect on rooting of scions or prolonging vase life of cut flowers. This is hardly surprising , since Kasuga's transgenic *Arabidopsis* plant was incapable of generating cut flowers.

The skilled artisan might well have understood that promotion of rooting might serve the ends of improved drought resistance, for example, but there was no basis the art for predicting that DREB expression could enhance rooting. As noted above, *Arabidopsis* also would not have been deemed a ready target for scion-based propagation. To the contrary, it was impossible before the present invention to associate (A) the fact that placing DREB1A-encoding DNA under the control of a rd29A promoter, as presently recited, would effect expression of stress-responsive proteins with (B) the promotion of rooting. Put another way, there was no reason for the skilled artisan to have looked to scion-based propagation of any transgenic plant, let alone one that expressed DREB1A-encoding DNA, in relation to solving a problem of lowered survival rate for rooting. Again, the examiner must rely on hindsight, *sub silencio*, to make these connections.

Dalton is cited for the alleged teaching of plant transformation methods prescribed by claim 15. Even take at face value, however, the examiner's reading of Dalton does not compensate for the above-discussed deficiencies in the primary and the secondary references. Accordingly, claim 15 is allowable as well over the cited art.

B. <u>Shinozaki '742 and Byrne</u>

Claims 1, 4 and 14 are rejected over U.S. Patent No. 6,495,742 to Shinozaki *et al.* in view of Byrne, *supra*. Claim 15 is rejected separately over Shinozaki '742 in view of Byrne and Dalton, discussed above. Applicants respectfully traverse each rejection.

Shinozaki's disclosure is similar to that of Kasuga. The examiner has advanced essentially the same rejection rationale, which is addressed in section A above. Accordingly, all arguments above are incorporated by reference.

Shinozaki ;742 additionally discloses that the host plant may be *Arabidopsis thaliana*, tobacco, rice and maize (see column 12, lines 4-5), but there is no suggestion that such plants might be propagated advantageously by scions. Each of the aforementioned hosts is a herbaceous plant.

As discussed above, the examiner has not yet established why the skilled artisan would have applied methodology suited to woody plants, per Byrne, for propagating Shinozaki's herbaceous transgenic plants. Moreover, even were the cited references so combinable, which they are not, one of ordinary skill in the art would have lacked basis for reasonable expectation of thereby obtaining transgenic plants characterized by improved rooting efficiency and prolonged vase life of cut flowers, given prior-art transgenic plants that were resistant to drought, salt, and freezing. Claim 15 is allowable for the same reasons, as Dalton does not remedy the deficiencies of Shinozaki and Byrne.

C. Shinozaki '528 and Byrne

Claims 1, 4, and 14 are rejected over U.S. Patent No. 6,670,528 to Shinozaki *et al.* in view of Byrne. Claim 15 stand rejected over Shinozaki in view of Byrne and Dalton. Applicants respectfully traverse each rejection.

Shinozaki '528 is cumulative of Shinozaki '742 and Kasuga, which are discussed in detail above. The secondary and tertiary references are the same, and the examiner has advanced essentially the same rationale to support this rejection. Accordingly, all arguments in sections A and B above are incorporated by reference.

In view of the foregoing, withdrawal of Section 103 rejections is warranted.

CONCLUSION

The present application is now in condition for allowance, and an early indication to this effect is respectfully requested. Examiner Kumar is invited to contact the undersigned directly, should he feel that any issue warrants further consideration.

Respectfully submitted,

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